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NASA-03601 (September 1999)

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA

Superseding NASA-03601 (September 1996)

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DIVISION 03 - CONCRETE

SECTION 03601

CATALYZED METALLIC GROUT

09/99

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NATIONAL AERONAUTICS **NASA**
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SECTION 03601

CATALYZED METALLIC GROUT
09/99

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NOTE: Delete, revise, or add to the text in this section to cover project requirements. Notes are for designer information and will not appear in the final project specification.

This section covers the material and application of expansive grout to ensure structural integrity of construction.

Associated work found in other sections includes preparation of surfaces to receive grout.

Drawings must indicate areas of application.

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PART 1 GENERAL

1.1 REFERENCES

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NOTE: The following references should not be manually edited except to add new references. References not used in the text will automatically be deleted from this section of the project specification.

****

The publications listed below form a part of this section to the extent referenced:

ASTM INTERNATIONAL (ASTM)

ASTM C 150	(2002) Standard Specification for Portland Cement
ASTM C 33	(2002) Standard Specification for Concrete Aggregates

1.2 SUBMITTALS

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NOTE: Review submittal description (SD) definitions in Section 01330, "Submittal Procedures," and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control. Include a columnar list of appropriate products and tests beneath each submittal description.

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The following shall be submitted in accordance with Section 01330, "Submittal Procedures," in sufficient detail to show full compliance with the specification:

SD-01 Preconstruction Submittals

Concrete Placement and Inspection Plan shall be submitted in accordance with paragraph entitled, "Concrete Placement/Inspection Plan," of this section.

SD-04 Samples

Contractor shall furnish samples of materials and copies of instructions of the manufacturer of the expansive admixture at least 45 days prior to start of grout operations.

Aggregates
Expansive Admixtures

SD-06 Test Reports

Test reports for the following tests shall be in accordance with paragraph entitled, "Expansive Grout," of this section.

Expansion
Compressive Strength

Inspection Reports for the following items shall be submitted in accordance with paragraph entitled, "Expansive Grout," of this section.

Expansive Grout
Portland Cement

SD-07 Certificates

Certificates shall be provided for the following items showing conformance with referenced standards contained in this section.

Portland Cement
Expansive Admixtures

Expansive Grout
Aggregates

1.3 Concrete Placement/Inspection Plan

Concrete Placement and Inspection Plan shall be provided by the Contractor showing details of proposed methods of application, and instructions of the manufacturer of the expansive admixture at least 45 days prior to the start of expansive concreting operations.

PART 2 PRODUCTS

2.1 PORTLAND CEMENT

Cement shall conform to ASTM C 150, Type I.

2.2 AGGREGATES

Aggregate shall conform to ASTM C 33 and shall be of the gradation as directed.

2.3 WATER

Water shall be potable.

2.4 EXPANSIVE ADMIXTURES

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NOTE: Select one of next two paragraphs depending on type of expansive admixture required.

Select the first paragraph for type a expansive grout, described below.

****

[Admixture shall consist of an oxidizable metallic aggregate.]

[Admixture shall consist of metallic aluminum powder.]

2.5 EXPANSIVE GROUT

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NOTE: Select one of the following two paragraphs depending on the type of grout required. Last paragraph is applicable to either selection. Types are described as follows:

Type A grout derives its expansive properties from oxidation of metallic aggregate. Oxidation and consequent expansion may be expected to continue until either the aggregate has been completely oxidized or until the grout, in plane, has been sealed off from further contact with oxygen.

Type B grout derives its expansive properties from the liberation of gas into the mixture during and after mixing. Chemical reaction causes evolution of hydrogen gas. Expansion may be expected to continue until either the gas-liberating mechanism has been exhausted or until the mixture has solidified to such an extent that the tendency for evolving gas to expand is effectively resisted by the stiffness of the grout.

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Inspection Reports for Expansive Grout and Portland Cement shall be provided by the Contractor including a copy of records of inspections and tests as well as the records of corrective action taken. These reports shall include descriptions of preparation of cavities for placement of grout and concrete; proper mixing, placement, and curing of grout and concrete; and methods of preventing discoloration.

[Grout shall be Type A containing an oxidizable metallic aggregate and an oxidation-promoting ingredient. Proportions shall conform to the manufacturer's instructions.]

[Grout shall be Type B containing metallic aluminum powder with alkali hydroxides in solution. Quantity of aluminum powder shall not exceed 1 teaspoon per bag of cement.]

When tested, expansive grout shall meet the following performance requirements:

Expansion: 28 days - Percent maximum: 0.4

- Percent minimum: 0.03

Compressive Strength: 4,000 psi 27.6 Megapascal

PART 3 EXECUTION

3.1 PREPARATION

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NOTE: Verify that the section referenced below is included in specification.

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Cavities to receive grout shall be prepared for grouting by cleaning away foreign matter, laitance, and free water and by saturation of contact surfaces of concrete and masonry for not less than 24 hours before grout application. Surfaces to receive grout shall be prepared as specified in Section 03300, "Cast-in-Place Concrete (Short Section)."

Blind cavities shall be filled by pressure injection under controlled venting. Injection shall be started and continued with the vent open until waste grout expelled through vent has the same consistency; the vent shall then be blocked and pressure built up to 60 psi gage 413 kilopascal, except

that lower pressures shall be used wherever damage to construction may result.

3.2 PLACING GROUT

Expansive concrete shall be either poured-in-place by conventional methods or prepacked aggregate with expansive grout pressure-injected, as best suited to the particular application. Minimum 28-day strength of concrete shall be 4,000 psi 27.6 Megapascal. Surfaces to receive concrete shall be prepared as specified for expansive grout.

3.3 PREVENTION OF DISCOLORATION

Where Type M expansive admixture is used, provisions shall be made to prevent discoloration of exposed surfaces of concrete, grout, or adjacent construction. Exposed surface shall be depressed a minimum of 1/2 inch 13 millimeter, deeply scored for bond, and plastered over after curing with preshrunk mortar. Latter shall be composed of 1 part Portland cement and 2.5 parts sand (by volume) with not more than 4.5 gallons of water per 94-pound 17 liter of water per 42.6 kilogram sack of cement. Ingredients shall be mixed and remixed without the addition of any ingredient after a shrinkage period of 0.5 hour in hot weather to 1 hour in cold weather. Surface of plaster shall be finished to blend with adjacent concrete.

-- End of Section --